

CERTIFICATE

The attachment of this certificate is a true copy of the following patent application that is filed with the Office.

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Application Number:	02 2 93048.5
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Title of the Design:	Laser Level
Applicant:	Chervon International Trading Co., Ltd
Inventor or Designer:	Shuming WU

Commissioner of the State Intellectual Property Office

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Jingchuan WANG

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证 明

本证明之附件是向本局提交的下列专利申请副本

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申 请 号： 02 2 93048.5

申 请 类 别： 实用新型

发明创造名称： 激光标线器

申 请 人： 南京泉峰国际贸易有限公司

发明人或设计人： 吴书明

中华人民共和国
国家知识产权局局长

王 景 川

2003 年 10 月 22 日



权 利 要 求 书

- 1、一种激光标线器(100)，包含一支架(1)，一左机壳(2)，一右机壳(3)，一挡板(4)，一定位在支架(1)的前架(1B)上的激光发射器(10)，一电池组(11)，一开关(41)，所述激光发射器(10)发出一扇面光束(13)并在被照射面上形成一条直线(131)，其特征在于：所述激光标线器(100)还包含一激光旋转机构(5)，所述激光旋转机构(5)与所述激光发射器(10)是联动的，旋转所述激光旋转机构(5)，即可带动所述激光发射器(10)，从而使所述直线(131)一起旋转。
- 2、如权利要求 1 所述的激光标线器(100)，所述挡板(4)可同时用于触发所述开关(41)，当向上拨动挡板(4)遮住激光发射器(10)的镜头(10A)时，同时使开关(41)断开，当向下拨动挡板(4)使激光发射器(10)的镜头(10A)露出时，同时使开关(41)开启。
- 3、如权利要求 1 或 2 所述的激光标线器(100)，其特征在于：所述激光旋转机构(5)还包含一旋钮(51)，两只小磁体(52,53)，在所述前架(1B)的相应位置上分别装有可与所述磁体(52,53) 吸合的两定位器(54,55)。
- 4、如权利要求 1 或 2 所述所述的激光标线器(100)，其特征在于：所述支架(1)的底架(1A)上装有一磁性物体(12)，使得所述激光标线器(100)可以吸合在铁质物体的表面。
- 5、如权利要求 3 所述所述的激光标线器(100)，其特征在于：所述支架(1)的底架(1A)上装有一磁性物体(12)，使得所述激光标线器(100)可以吸合在铁质物体的表面。



6. 如权利要求 4 所述的激光标线器(100), 其特征在于: 在所述激光标线器的底架(1A)上可以装一可拆卸底座(7), 所述可拆卸底座(7)上包含两个按钮(73), 每个按钮(73)含有至少一根定位针(72), 所述按钮(73)被按下时, 所述定位针(72)伸出于所述可拆卸底座(7)的底面(74), 所述可拆卸底座(7)上还含有一第二磁体(71)与所述底架(1A)上的磁性物体(12)相吸合。

7. 如权利要求 4 所述的激光标线器(100), 其特征在于: 在所述激光标线器的底架(1A)上可以装一可拆卸底座(7), 所述可拆卸底座(7)上含有两个按钮(73), 每个按钮(73)含有至少一根定位针(72), 所述按钮(73)被按下时, 所述定位针(72)伸出于所述可拆卸底座(7)的底面(74), 所述可拆卸底座(7)上还含有一第二磁体(71)与所述底架(1A)上的磁性物体(12)相吸合。



说明书

激光标线器

技术领域

本实用新型涉及一种在物体表面上映出一条直线作为参照定位的标线器，特别是一种用激光发射器发出的光线进行标线的激光标线器。

背景技术

目前市场上采用激光发射器发出的线进行标线的激光标线器，激光工具尺等有很多，如美国工具公司就推出一种可发出一条固定直线的激光标线器，美国 CTB/berger 公司（CTB/伯杰公司）也推出一种激光标线器，可在标线器前面的墙壁上形成十字交叉的一条水平线和铅垂线。但是，前者只能发出一条与其基座底面相平行的直线，在基座底面所附着的面上形成一条直线；后者虽然能相对于标线器的底面形成两条相垂直的线，但其缺点是需要两个激光发射器，且不管是否需要，只要开关开启，两个激光发射器即同时发出光线，耗电量较大。

发明内容

本实有新型的目的是提供一种只带一个激光发射器的激光标线器，激光发射器可旋转 90 度，从而改变激光线与底座底面之间的位置关系。

本实用新型的另一个目的是解决激光标线器在铁件上的定位问题。

本实用新型还有一个目的是提供一个可拆卸的底座，该底座上可以伸出两至六根针，从而解决激光标线器在塑料、软木或其它物体上的定位。

本实用新型还有一个目的是提供水平泡，用于确定激光线相对于水平或垂直的关系。

为了实现以上目的，本实用新型中的激光标线器包含一个支架，一由左壳体和右壳体构成的外壳，一激光发射器，一电池组用于为激光发射器提供电源，一电池盖，一开关，一挡板和一旋转机构。所述挡板同时用于开启或关闭开关的触发器，当所述挡板处于关闭位置时，其使开关处于断开状态从而使激光处于关闭状态，这样，既关闭了激光发射器，又在关闭状态下，使激光发射器的镜头得到保护；当拨动所述挡板使其处于打开的位置时，其同时也拨动开关使开关处于闭合状态，使激光标线器发出一束扇面光束进而在一个平面上形成一条直线。

所述旋转机构可以包含一可旋转 90 度的旋钮，该旋钮与激光器是联动的，旋转该旋钮就可以带动激光发射器一起旋转，这样就可以使射在平面上的直线一起旋转。

在支架的底架上可以装有一磁性物体，当需要将标线器定位在铁器上时，只需将该标线器放在该物体上即可较好地吸合上去。从而解决非水平面上的定位问题，并提高了定位的稳定性，防止定位的偏移。

所述的激光标线器还可以包含一个可拆卸底座，所述可拆卸底座上装有两根或多根定位针，当需要将标线器固定在木料、塑料件或其它非刚性物体上时，可以将针顶出并压入定位物体中，不用时则可将针缩回到可拆卸底座的本体中。

为方便使用，该激光标线器采用电池供电，只需将电池盖轻轻旋下即可方便地更换电池。



本实用新型所揭示的激光标线器的顶上还可以装有两个互相垂直的水平泡，它们均平行于激光标线器的底面，可以用于给出精确的水平线或铅垂线。

利用本实用新型所揭示的激光标线器可以很方便地在所需的表面上标出相应的参考直线，该直线可以平行于激光标线器的底面，也可以垂直于其底面，或调节成其它角度。

附图说明：

图 1 为本实用新型中的激光标线器的结构示意图；

图 2 为去除左壳体后的激光标线器的内部结构示意图；

图 3 为激光旋转机构右旋到底、激光线与激光标线器的底面平行时的旋转机构示意图；

图 4 为激光旋转机构左旋到底、激光线与激光标线器底面垂直时的旋转机构示意图；

图 5 为激光标线器的可拆卸底座的结构示意图；

图 6 为激光标线器的可拆卸底座上定位针缩在底座中时的结构示意图；

图 6 为激光标线器的可拆卸底座上定位针伸出时的结构示意图；

图 7 为本实用新型中的激光标线器置于垂直面上时的示意图；

具体实施方式

如图 1 和图 2 所示，本实用新型中的激光标线器 100 包含一支架 1、一左机壳 2、一右机壳 3、一激光挡板 4、一定位在支架 1 的前架 1B 上的激光发射器 10、用作激光发射器 10 的电源的一电池组 11、用于控制激光发射器 10 的一开关 41 及一电池盖 6。激光挡板 4 可同时用于触发

开关 41，如图 1 所示，当激光挡板 4 处于关闭状态时，开关 41 处于关闭状态，这样既关掉了激光发射器 10，又在标线器不用的时候，起到了保护激光发射器的作用；如图 2 所示，将激光挡板 4 向下推，使激光发射器 10 的镜头 10A 露出，同时又触动开关 41，使开关 41 处于开启状态，这样，激光发射器 10 就不受阻挡地向前发出一束扇形光 13，并在被照射表面形成一条直线 131。

如图 3 及图 4 所示，为了解决以往技术中存在的问题，本实用新型中的激光标线器 100 的激光发射器 10 含有一个旋转机构 5，该旋转机构可以是一个固定在激光发射器 10 上的旋钮 51，旋钮 51 旋转时激光发射器 10 跟着一起旋转。当旋钮 51 顺时针旋到底时，激光发射器 10 发出的光束与激光标线器 100 的底面垂直/或平行；当旋钮 51 反时针旋到底时（旋转角度最好为 90 度），激光发射器 10 发出的光束与激光标线器 100 的底面平行/或垂直。为了防止旋钮任意转动而影响光束位置的稳定性，可以在旋钮 51 上各装两只小磁体 52，53，并在前架 1B 的相应位置上装两个可被小磁体 52，53 吸合的定位器 54，55，当旋钮 51 右旋到底时，小磁体 52 与定位器 55 吸合；当旋钮 51 左旋到底时，小磁体 53 与定位器 55 吸合，这样就保证了旋钮 51 的定位，从而保证了光束位置的稳定性。

如图 1 和图 2 所示，在本实用新型中的激光标线器 100 上还可以装有一个或两个水平泡 8，9 用于精确定位激光标线器 100 的水平，所述水平泡 8，9 均平行于激光标线器 100 的底面，其中水平泡 8 用于指示所述激光标线器 100 的左右水平，水平泡 9 用于指示所述激光标线器 100 的

前后水平,利用水平泡 8 可以使激光标线器给出精确的水平线或铅垂线。

如上所述的激光标线器只能置于相对水平的面上使用,为了解决定位问题,如图 2 所示,在激光标线器 100 的支架 1 的底部 1A 上可以含有一磁性物体 12,这样就可以吸在铁质物体的任意表面上。

但是,支架 1 上加磁性物体 12 后,仅能解决在铁质物体上的定位,为了解决激光标线器在木料、塑料件或其它非刚性物体上的定位,如图 1 所示,可以在标线器 100 上加一个可拆卸底座 7,如图 5 所示,所述底座 7 上有两个按钮 73,所述每个按钮 73 上至少包含一定位针 72,在本实用新型的实施例中,每个按钮 73 上采用了三根定位针 72,当所述按钮 73 处于松弛状态时,定位针 72 的针尖缩在可拆卸底座 7 中,如图 6 所示,不会对操作者造成刺伤;按下按钮 73,定位针 72 同时伸出底座 7 的底面 74,如图 7 所示,这样,就可以利用伸出的定位针 72 将所述底座 7 连同激光标线器 100 固定在非刚性物体上。在所述底座 7 上还可以加一块第二磁体 71,这样,将底座 7 装在激光标线器 100 上时,第二磁体 71 与磁性物体 12 相吸合,从而加强了可拆卸底座 7 与激光标线器 100 的配合。

图 8 为激光标线器 100 定位于垂直面上、激光向下发射时的示意图。

本实用新型中的激光标线器并不仅限于以上的实施例,也可以做成其它形式而达到相同的目的。

本实用新型与以往技术相比,解决了激光标线器需要两只激光发射器才能进行不同位置标线的问题,同时还解决了标线器在不同物体上的定位问题。

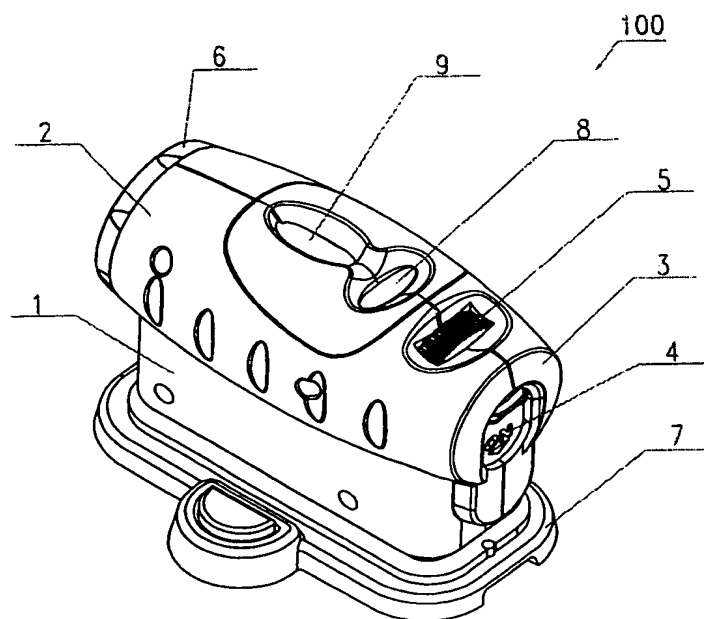


图 1

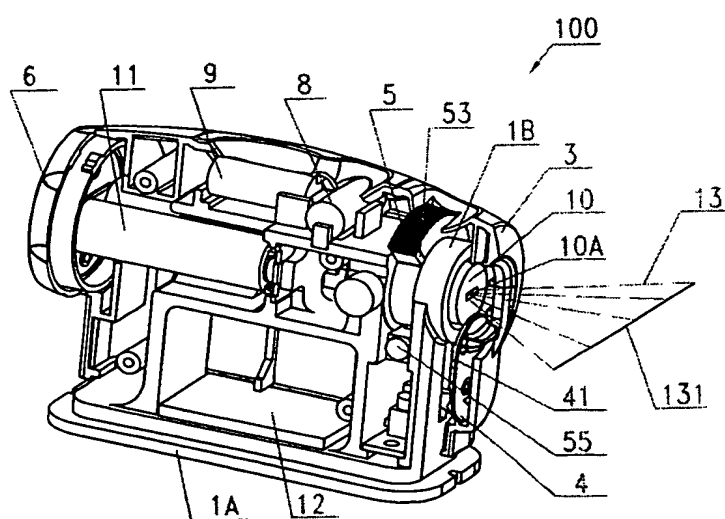


图 2

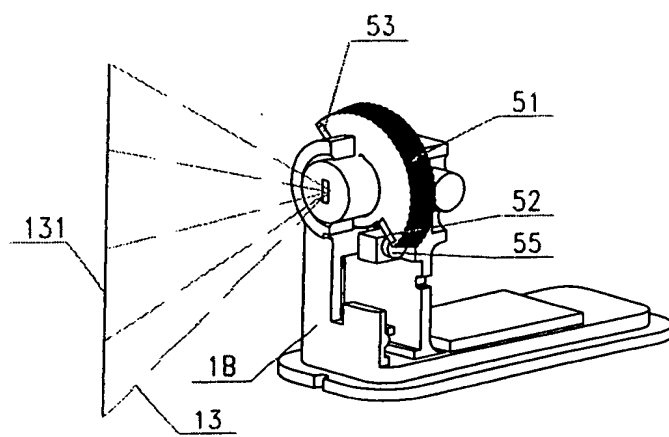


图 3

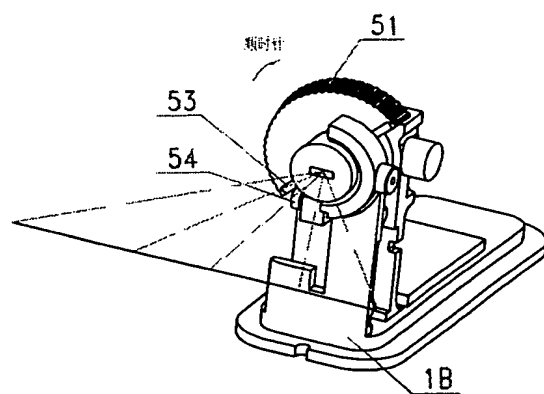


图 4

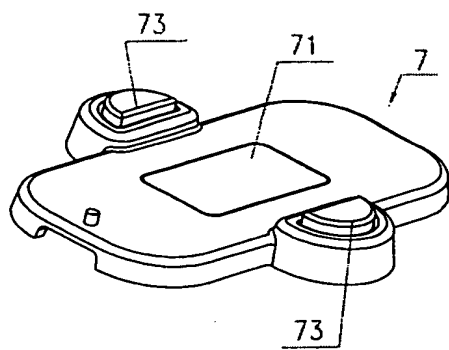


图 5

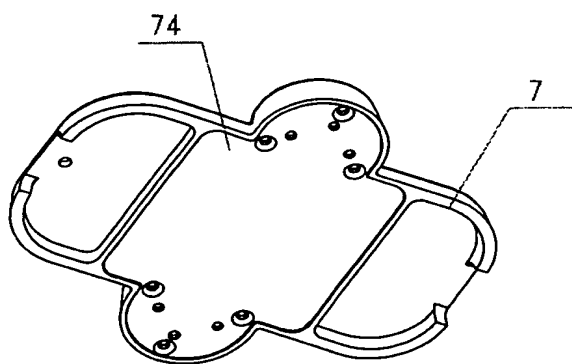


图 6

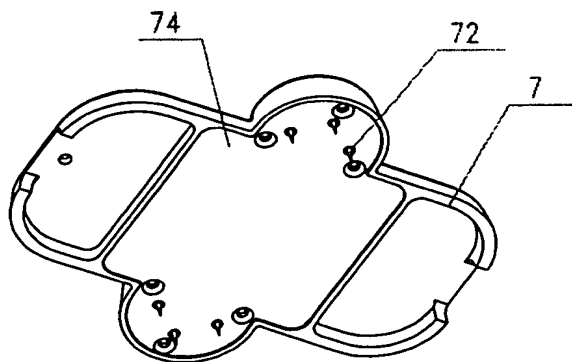


图 7

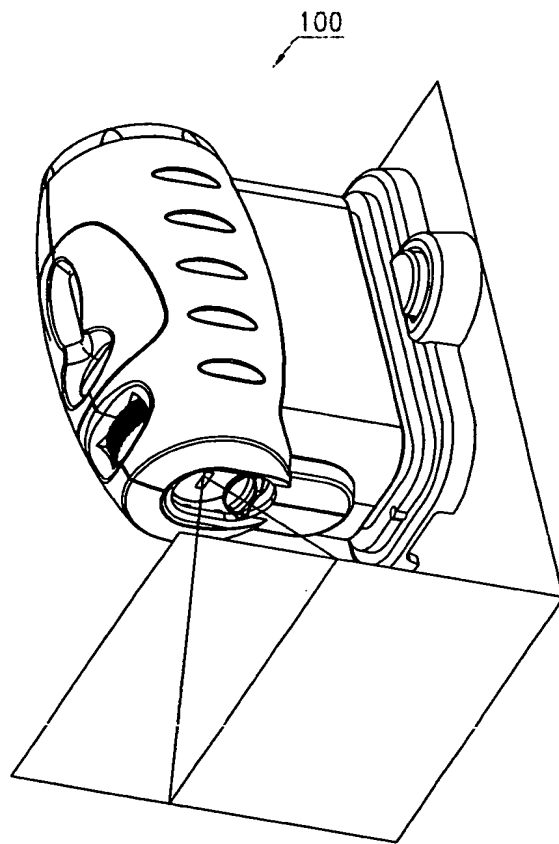


图 3

CERTIFICATE

The attached is a true English language translation of the Chinese patent application No. 02 2 93048.5 filed December 27, 2002.

CLAIMS

1. A laser level with adjustable laser projection line (100), comprising:
 - a support bracket (1);
 - a left clamshell housing member (2);
 - a right clamshell housing member (3);
 - a projective door (4);
 - a laser generator (10) which is situated on the front bracket (1B) of the support bracket (1);
 - a battery(11);
 - a switch (41);said laser generator (10) projects a fan-shaped laser beam (13) forwardly to a line (131) along the surface being illuminated. Said laser level with adjustable laser projection line (100) also comprises a rotating mechanism (5) which is coupled with laser generator (10) to rotate the laser generator (10) when the rotating mechanism (5) being rotated around, thereby causing the rotation of said line (131).
2. The laser level with adjustable laser projection line (100) of claim 1, wherein said protective door (4) can trigger the switch (14) at the same time. When the protective door (4) is poked upwardly to cover the lens (10A) of the laser generator (10), the switch (41) is cutoff thereby; when the protective door (4) being opened downwardly to access the lens (10A), the switch (41) is turned on at the same time.
3. The laser level with adjustable laser projection line (100) of claim 1 or 2, wherein said rotating mechanism (5) further comprises a knob (51) and two little magnetic means (52, 53). And two positioning means (54, 55) which can be caught by the little magnetic means (52, 53) are supported on the corresponding position of the front bracket (1B);
4. The laser level with adjustable laser projection line (100) of claim 1 or 2, wherein the base (1A) of said support bracket (1) comprises a magnetic means (12), which hold the laser level (100) to the surface of the iron object.
5. The laser level with adjustable laser projection line (100) of claim 3, wherein the base (1A) of said support bracket (1) comprises a magnetic means (12), which hold the laser level (100) to the surface of the iron object.
6. The laser level with adjustable laser projection line (100) of claim 4, wherein the base (1A) can be coupled with a removable pedestal (7), said pedestal (7) comprises two buttons (73) each of which comprises at least one retractable pin (72), when said buttons (73) are pressed down, said pins (72) protrude from the bottom (74) of the pedestal (7), in addition, said removable pedestal (7) comprises a second magnetic (71) use to attract the magnetic means (12) on the base (1A).
7. The laser level with adjustable laser projection line (100) of claim 5, wherein the base (1A) can be coupled with a removable pedestal (7), said pedestal (7) comprises two buttons (73) each of which comprises at least one retractable pin (72), when said buttons (73) are pressed down, said pins (72) will protrude from the bottom (74) of the pedestal (7), in addition, said removable pedestal (7) comprises a second magnetic (71) used to attract the magnetic means (12) on the base (1A).

DESCRIPTION

LASER LEVEL WITH ADJUSTABLE LASER PROJECTION LINE

FIELD OF THE INVENTION

The present invention relates to an alignment-product which reflects a line on a surface as a positioning reference, and particularly to a laser level which marks a line on a reference surface with the fanned beam projected by a laser generator.

BACKGROUND OF THE INVENTION

There are many kinds of laser alignment device, which project laser beams by laser generators to mark lines. One such device is designed by U.S. Tool Co., which can project a line of fixed orientation. Another such device is marketed by U.S. CTB/Berger, which can project a horizontal line and a plumb line decussate to each other on walls perpendicular to the direction of propagation of the laser. The former can merely project a line parallel to the baseplane of its pedestal; the latter can form two lines vertical with each other, but there is a disadvantage that two laser generators are needed, and as the switch is turned on, required or not, the two laser generators project beams simultaneously, thereby causing much more power consumption.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a laser level with only one laser generator which can be rotated 90 degrees to alter the location relationship of the laser beam with the base plane of the laser level.

Another object of the present invention is to provide a means to mount the laser level on a metallic surface.

A further object is to provide a separate base plate which can protrude a plurality of retractable pins to suspend and hold the laser level on a surface of plastic, cork, wood, drywall or other soft object.

An even further object of this invention is to provide one or more leveling bubbles to indicate whether the laser beam is horizontally or vertically level.

To achieve the objects hereinbefore, the laser alignment device of the present invention includes a support bracket, a clamshell housing defined by a left clamshell housing member and a right clamshell housing member, a laser generator, a battery to power the laser generator, a cover for a battery pack, a switch, a protective door and a rotating mechanism. The protective door is used to activate the trigger of the linked switch. The laser generator will be switched off when the door is closed, and the lens of the laser generator will be protected against dust. When the door is opened, the switch connects the laser generator to the power supply and the laser generator will project a fan-shaped laser beam to form a line on a surface.

The rotating mechanism includes a knob which can rotate from 0 to 90 degrees, and which is coupled to the laser generator to rotate the laser generator when the knob is turned, thereby causing rotation of the line on the plane.

There may be a magnetic attachment means on the base of the support bracket. When it is necessary to secure the laser level on a surface of a metallic object one needs only to place the

laser level with adjustable laser projection line onto the metallic object, and the laser level will be held there via the magnetic attachment means. In this manner, the laser level can be positioned on a non-horizontal plane in a relatively secure position, and avoid instability.

The laser level with adjustable laser projection line also includes a separate removable mounting baseplate having two or more retractable pins which can be extended from the removable mounting baseplate and inserted into the wall, wood, plastic or other soft object as desired. When not in use, the pins can retract into a cavity in the removable mounting baseplate.

The laser level with adjustable laser projection line can be powered by an internal battery. The user need only screw the cover off without the aid of a tool to remove the discharged battery cells and fill in new battery cells to power the laser generator.

The laser level can further comprise two conventional leveling bubbles which are perpendicular to each other on the top of the laser level. The two level bubbles are both parallel to the bottom of the laser level, for orientation or leveling a precise horizontal line or plumb line.

The laser level with adjustable laser projection line disclosed by the present invention can expediently mark a reference line accordingly on a workpiece as needed. The reference line can be parallel, vertical or be adjusted to other angular degrees to the bottom of the laser level.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG.1 illustrates a perspective view of a preferred embodiment of a laser level with adjustable laser projection line according to the present invention;

FIG.2 is an inner perspective view of the laser level with left clamshell housing member removed;

FIG.3 is a sectional view of the mechanism for rotating the laser when the mechanism is rotated to its right limit with the laser beam perpendicular to the bottom plate of the laser level;

FIG.4 is a sectional view of the rotating mechanism when it is rotated to its left limit with the laser beam parallel to the bottom plate of the laser level;

FIG.5 is a sectional view of the removable base plate;

FIG.6 is a sectional view of the removable base plate wherein the positioning pins are retracted inside the removable base plate;

FIG.7 is a sectional view of the removable base plate wherein the positioning pins protrude outward;

FIG.8 is a perspective view of the laser level with adjustable laser projection line when it is positioned and held on a vertical plane.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIG.1 and FIG.2, the laser level with adjustable laser projection line 100 of the present invention comprises a support bracket 1, a left clamshell housing member 2, a right clamshell housing member 3, a laser protection door 4, a laser generator 10 mounted on the front bracket 1B of the support bracket 1, a battery pack 11 or power supply to power the laser generator 10, a switch 41 to control the laser generator 10 and a cover 6 for the battery pack. The protective door 4 can trigger the switch 41 when it is opened or closed, as shown in FIG.1. As the door 4 is in the closed position, it slides the switch 41 to the off position and switches off the laser generator 10. The closed door 4 also protects the laser generator 10 and lens 10A against dust. When the door 4 is pushed downwardly to access lens 10A of the laser generator 10, as shown in

FIG.2, the door 4 slides the switch 41 to the on position at the same time, switching on the laser generator 10 to project a fan-shaped laser beam 13 and form a line 131 on the surface to be illuminated.

Referring now to FIG.3 and FIG.4, the laser generator 10 in the laser alignment device 100 of the present invention includes a rotating mechanism 5, which can have a knob 51 secured on the laser generator 10 which will rotate along with the rotation of knob 51. When knob 51 is turned clockwise to its limit, the planar beam projected by the laser generator 10 will be parallel to the bottom of laser level 100 (FIG.4); and, when knob 51 is turned counterclockwise to its limit (the angular degree of rotation preferably being 90 degrees), the planar beam projected by the laser generator 10 will be perpendicular to the bottom of the laser alignment device 100 (FIG.3). To avoid knob 51 from rotating arbitrarily and affecting the stability of the laser beam position accordingly, it is preferred to arrange two magnetic members 52, 53 on knob 51, and arrange two fastening member 54, 55 on the corresponding position of the front bracket 1B. When the knob 51 being rotated to its clockwise limit, the fastening member 54 is caught by the magnetic member 53; and when knob 51 rotates to its counterclockwise limit, the fastening member 55 is caught by the magnetic member 52, ensuring the position of knob 51 and thereby maintaining the stability of the laser beam position.

Referring to FIG.1 and 2, the laser alignment device 100 of the present invention may advantageously comprise one or more leveling devices such as bubbles 8, 9 to orientate or level the laser level 100 on a horizontal or vertical plane. The leveling bubbles 8, 9 are parallel to the bottom of the laser level 100. Bubble 8 is used to level the horizontal relationship of the elongated side position of the laser level with adjustable laser projection line 100, and bubble 9 is used to level the horizontal relationship of fore-and-aft position of the laser level 100. Thus, laser level 100 can provide accurate horizontal lines and plumb lines with the usage of the leveling bubbles 8, 9.

The laser level with adjustable laser protection line 10 as described above can also be used on a horizontal position for a metallic surface. To solve this problem, as shown in FIG.2, a magnet 12 is mounted on the base 1A of the support bracket 1 of the laser level 100, thereby allowing laser alignment device 100 to be placed and held on an arbitrary portion of the metallic surface.

To position laser level 100 on a wood, plastic, drywall or other surface, as shown in FIG.1, a removable baseplate 7 may be used with the laser level 100 for mounting. As shown in FIG.5, the baseplate 7 comprises two pushpads 73 each including at least one retractable positioning pin 72. In the embodiment shown in FIGS.5-7, there are three retractable pins 72 on each pushpad 73. When pushpads 73 are relaxed, the retractable pins 72 are retracted within the removable mounting baseplate 7, as shown in FIG.6, thus preventing the operator from being stabbed carelessly. When pushpads 73 are pressed down, the positioning pins 72 will extend outwardly from the bottom 74 of the mounting baseplate 7 as shown in FIG.7. The mounting baseplate 7 can be mounted to the surface of a wall by inserting the retractable pins 72 into the surface. The laser level 100 can then be attached to the mounting baseplate 7 by placing the magnet 12 on the bottom of the laser level 100 to a metallic attachment surface 71 on the mounting baseplate 7 thereby fastening the laser level 100 to the baseplate 7.

FIG.8 is a perspective view of the laser alignment device 100 when it is situated on the vertical plane with the laser beam projecting downwardly.

The above described embodiments, of course, are not to be construed as limiting the ranges

of the present invention. Modifications, and other alternative constructions, will be apparent which are within the spirit and scope of the invention.